

4. Test the diode as follows:
 - a. Set an ohmmeter to the $R \times 1$ scale.
 - b. Check for continuity between the middle terminal on the diode (A, **Figure 45**) and one of the end terminals (B). Reverse the ohmmeter leads and recheck for continuity between the same terminals. The ohmmeter should read continuity during one test and no continuity (infinite resistance) with the leads reversed.
 - c. Repeat substep b by checking for continuity between the middle terminal and the remaining end terminal.
 - d. Replace the diode if it fails the continuity tests.
5. Reverse Steps 1-3 to install the diode.

ELECTRIC SHIFT SYSTEM

FE and TE models are equipped with the electric shift system. The shift components are controlled by the electronic control unit (ECU). Input from switches and sensors prompts the ECU to operate the shift control motor, which drives a set of reduction gears to actuate the transmission shift components and the clutch. Refer to **Figure 46**.

Operation

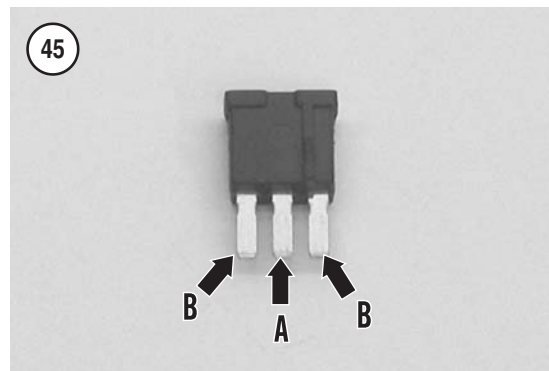
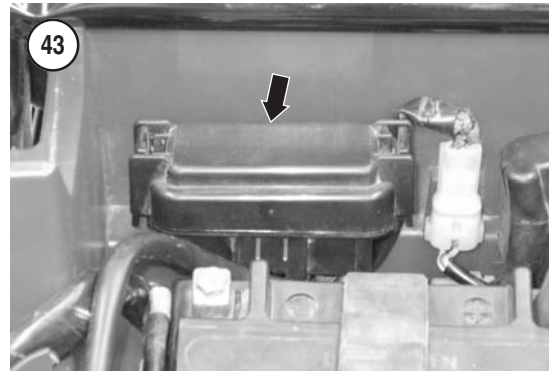
The shift control motor (**Figure 47**) may rotate in either direction. Rotation transfers through the gear reduction assembly to the gearshift spindle. The gearshift spindle controls the transmission and change clutch similar to manually shifted models. When the control motor rotates, the gearshift spindle rotates thereby disengaging the change clutch and shifting gears.

The angle sensor converts gearshift spindle motion into electrical signals that are sent to the ECU.

The computer portion of the ECU converts the input signals from the switches and sensors into directional signals for the motor circuit, which powers the control motor. The ECU also contains a self-diagnostic circuit that stops operation of the electronic shift system if it detects an error.

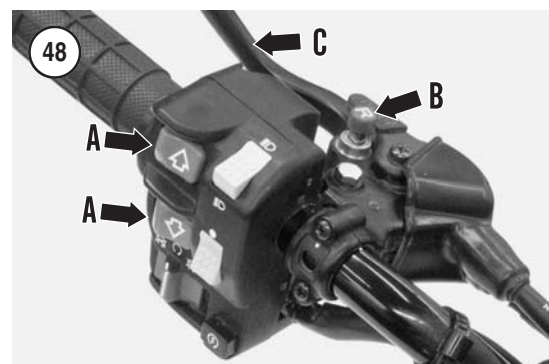
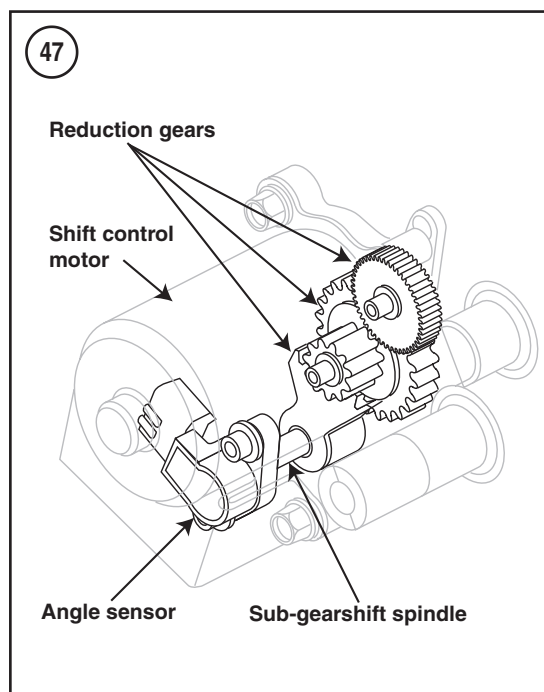
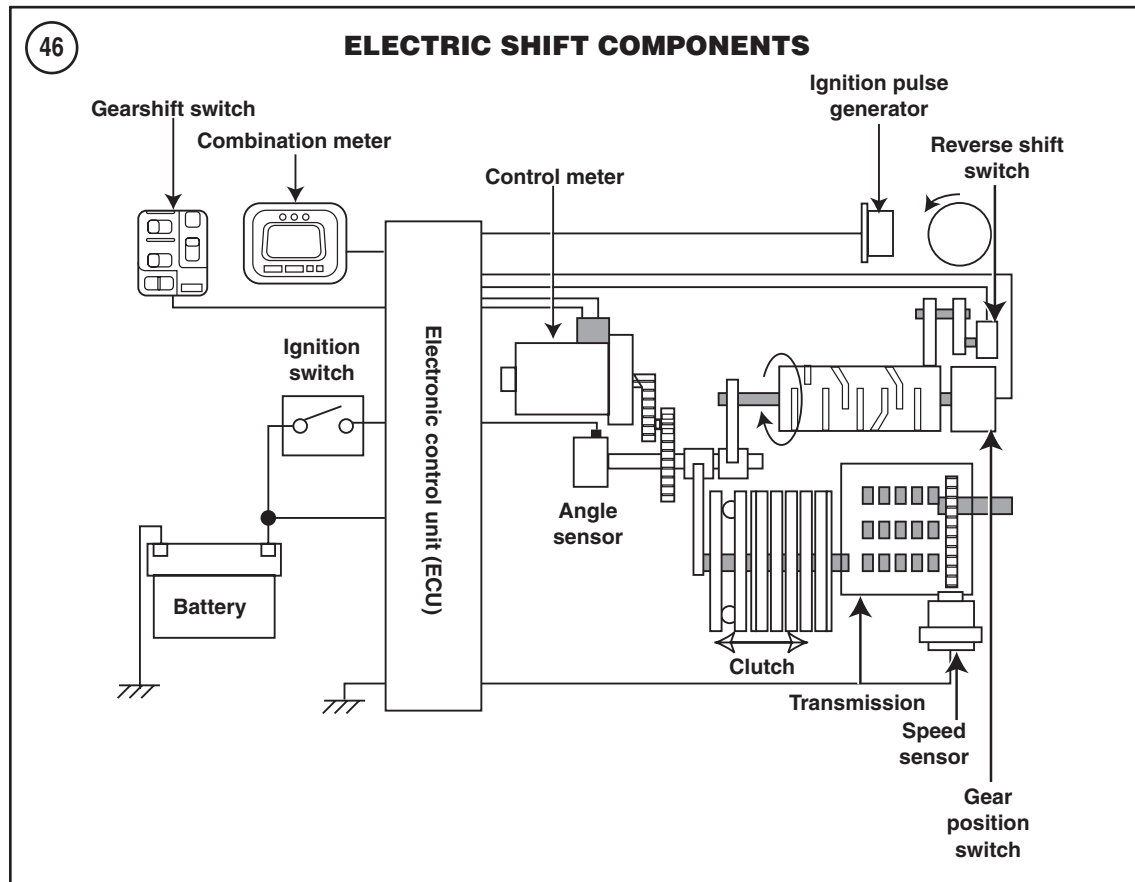
NOTE

If the electronic shift system malfunctions, turn off the ignition switch, wait a short time, then turn it back on. If the electronic shift system malfunc-



tion remains, refer to Chapter Two and follow the troubleshooting procedure.

The gearshift switches on the left handlebar assembly (A, **Figure 48**) send shift up or shift down signals to the ECU. The reverse shift button (B, **Figure 48**) engages the reverse shift cable when the rear brake lever is pulled. The reverse cable actuates the internal reverse arm, which operates the reverse switch on the rear crankcase cover. The reverse switch informs the ECU that the control motor may



be operated so the transmission may be shifted into reverse.

NOTE

The rear brake lever (C, **Figure 48**) must be pulled in to engage the reverse shift button.

The gear position indicator switch sends a signal to the ECU to indicate the position of the shift drum.

The ECU sends a signal to the combination meter which displays a number to indicate the selected gear.

Signals from the ignition pulse generator and the speed sensor indicate to the ECU the speed of the engine and the ATV.

Electronic Control Unit (ECU)

Troubleshooting

A testing procedure is not available for the ECU. Refer to Chapter Two and determine if the ECU is faulty by eliminating other possible causes for an electric shift malfunction.

Removal/installation

CAUTION

The ECU may be damaged by voltage surge. Make sure the ignition switch is off before detaching the electrical connectors.

CAUTION

The ECU may be damaged if it is dropped or struck. Use care when handling the ECU.

1. Disconnect the electrical connectors (**Figure 49**) from the ECU.
2. Remove the ECU.
3. Inspect the mounting cushion and replace it if it is damaged.
4. Reverse the removal steps to install the ECU.

Control Motor

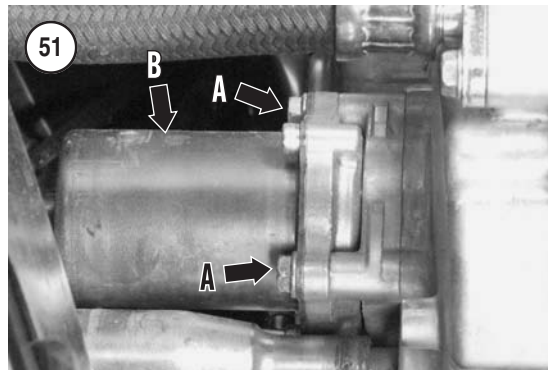
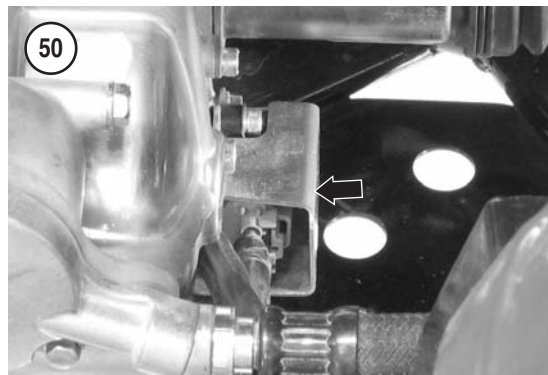
Testing

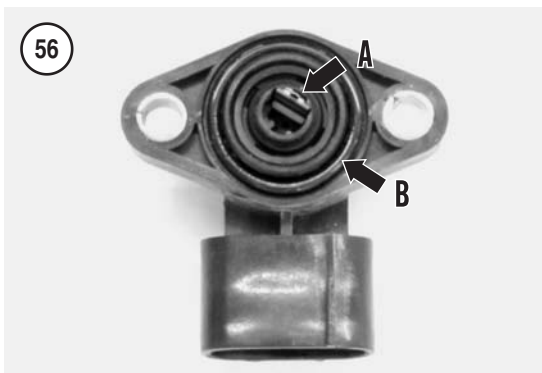
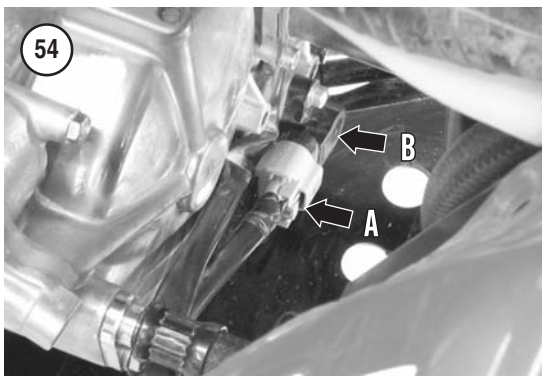
CAUTION

Do not attempt the following procedure with the shift control motor in the circuit. Doing so may damage the ECU.

Test the shift control motor as follows:

1. Remove the motor as described in the following section.
2. Connect a 12-volt battery to the terminals of the shift motor connector. Replace the motor if it does not operate. Individual parts are not available.





Removal/installation

1. Make sure the ignition switch is off.
2. Remove the angle sensor cover mounting bolts, then remove the cover (**Figure 50**).
3. Disconnect the control motor electrical connector (A, **Figure 1**). Detach the wire clamps securing the wire to the frame.
4. Remove the control motor mounting bolts (A, **Figure 51**), then remove the control motor (B).
5. Inspect the O-ring (**Figure 52**) and replace it if it is damaged or hard.

NOTE

*Make sure the control motor wire (**Figure 53**) passes under the sensor cover during assembly.*

6. Reverse the removal steps to install the control motor while noting the following:
 - a. Apply engine oil to the O-ring.
 - b. Install the angle sensor cover so the slot fits around the lug on the crankcase cover.
 - c. Tighten the mounting bolts securely.

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Angle Sensor

Testing/replacement

1. Make sure the ignition switch is off.
2. Remove the right center mud guard as described in Chapter Fifteen.
3. Remove the angle sensor cover mounting bolts, then remove the cover (**Figure 50**).
4. Disconnect the electrical connector (A, **Figure 54**) from the angle sensor.
5. Remove the angle sensor mounting bolts, then remove the angle sensor (B, **Figure 54**).
6. Connect an ohmmeter to the center and end terminals indicated in **Figure 55**.

CAUTION

Do not damage the sensor shaft hole when turning the shaft in Step 7.

7. Rotate the sensor shaft (A, **Figure 56**) slowly clockwise while watching the ohmmeter. The ohmmeter reading should decrease slowly when the shaft is turned clockwise, and increase slowly when the shaft is turned counterclockwise. Rotate the sensor shaft slowly counterclockwise. The ohmmeter reading should increase slowly.

8. Inspect the sensor shaft hole for damage or excessive wear.
9. Reverse the removal procedure to install the angle sensor while noting the following:
 - a. Install a new O-ring onto the angle sensor (B, **Figure 56**).
 - b. Align the flats on the sensor shaft (A, **Figure 56**) and the gearshift spindle (**Figure 57**) when installing the angle sensor onto the crankcase cover.
 - c. Apply a threadlock to the sensor mounting bolts.
 - d. Tighten the sensor mounting bolts to 6 N•m (53 in.-lb.).

NOTE

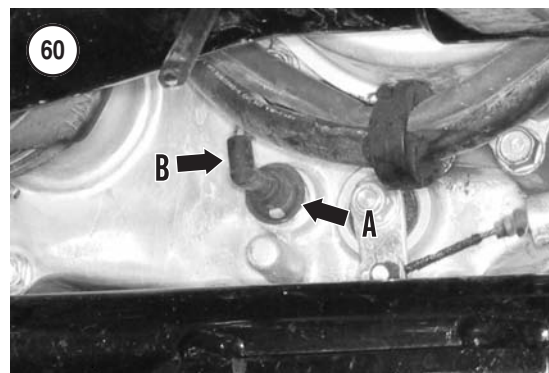
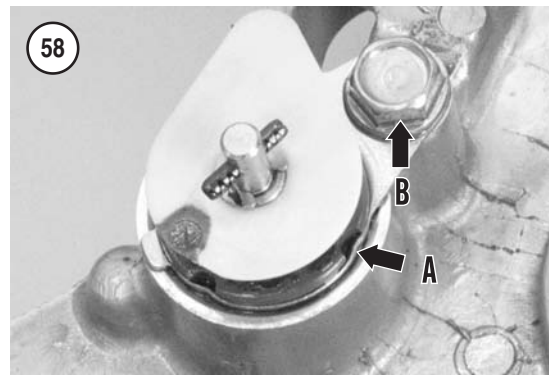
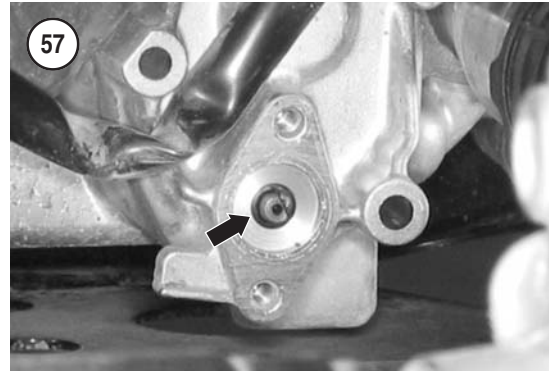
*Make sure the control motor wire (**Figure 53**) passes under the sensor cover during assembly.*

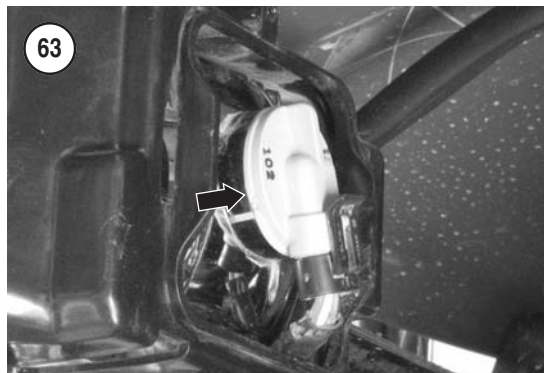
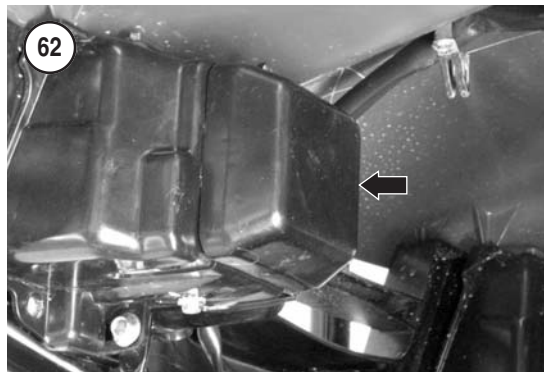
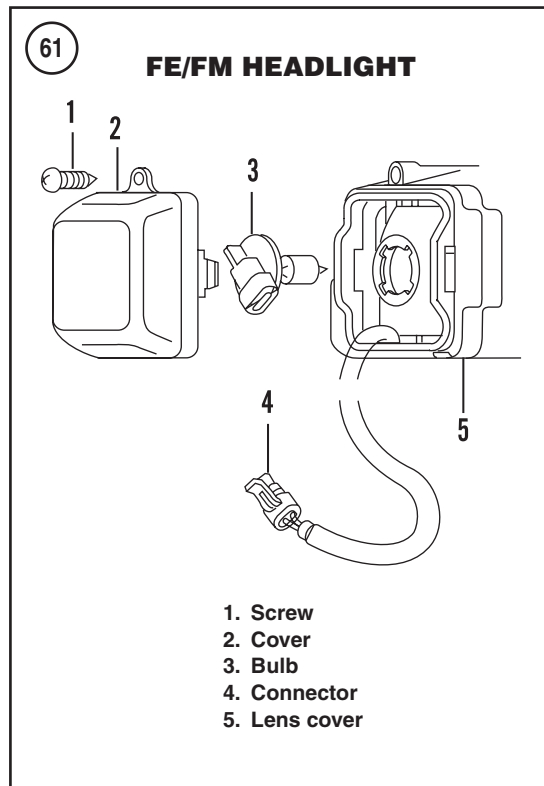
Gear Position Switch

The gear position switch is mounted on the inside of the rear crankcase cover (A, **Figure 58**).

Testing/replacement

1. Disconnect the gear position switch connector (A, **Figure 2**).
2. Switch an ohmmeter to the R × 1 scale and connect the leads between each wire terminal and ground. The ohmmeter should show continuity when the transmission is in neutral or in gear. Refer to wiring diagram.
3. If any readings are incorrect, replace the gear position switch as follows:
 - a. Remove the rear crankcase cover (Chapter Five).
 - b. Remove the wire grommet from the cover (**Figure 59**).
 - c. Remove the gear position switch retaining bolt (B, **Figure 58**), then remove the switch (A).
 - d. Remove all threadlock residue from the bolt and bolt threads.
 - e. Apply a threadlock to the bolt threads.
 - f. Install the gear position switch and tighten the bolt to 12 N•m (106 in.-lb.).
 - g. Apply sealant to the grommet and install it into the rear crankcase cover.
 - h. Install the rear crankcase cover (Chapter Five).





Reverse Shift Switch

Testing/replacement

The reverse shift switch (A, **Figure 60**) is mounted on the rear crankcase cover. The reverse shift switch sends a signal to the electronic control unit of the electric shift system to indicate that the transmission is in reverse gear.

1. Remove the seat as described in Chapter Fifteen.
2. Remove the alternator (B, **Figure 2**) and gear position/reverse switch (A) connectors from the frame.
3. Disconnect the gear position/reverse switch connector (A, **Figure 2**).
4. Switch an ohmmeter to the $R \times 1$ scale and connect the leads between the gray/red wire terminal in the switch end of the connector and ground. The ohmmeter should show continuity with the reverse button depressed and infinity when the button is released.
5. If any readings are incorrect, replace the reverse shift switch as follows:
 - a. Detach the switch wire (B, **Figure 60**) from the switch (A).
 - b. Remove the switch. Discard the washer.
 - c. Install the switch and a new washer. Tighten the switch to 13 N•m (115 in.-lb.).

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LIGHTING SYSTEM

The lighting system consists of a headlight, assist headlight, taillight and indicator lights. **Table 4** lists replacement bulbs for these components.

Always use the correct wattage bulb. Using the wrong size bulb will produce a dim light or cause the bulb to burn out prematurely.

Headlight Bulb Replacement (FE/FM Models)

WARNING

If the headlight just burned out or was just turned off, it will be hot! Do not touch the bulb until it cools.

Refer to **Figure 61**.

1. Remove the screw and the headlight bulb cover (**Figure 62**).
2. Turn the bulb (**Figure 63**) counterclockwise and remove it.

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